

## Center for Space and Earth Science

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## Towards a High Precision Treatment of Neutrino Cosmology

Thursday, October 20, 2016

1:00-2:00 PM

Challenge Conference Room  
TA-03, Bldg. 200, Rm 256

**Abstract:** We use the laboratory of the early universe to constrain physics beyond the standard models of particle physics and cosmology. Our methods utilize codes to self-consistently follow neutrino spectra over many Hubble times. We make predictions on how new physics will modify the cosmological observables related to the neutrino sector. Specifically, we investigate changes in the neutrino energy density, the primordial nuclide abundances of helium and deuterium, and the baryon density. We will focus on the epoch when the neutrinos decouple from the thermal plasma and the numerical models of the weak, strong, and electromagnetic reactions between the constituents of the early universe.

**Biography:** Evan Grohs attended the University of Chicago as an undergraduate. He then went to the University of California San Diego for his graduate work in physics, where he was advised by George Fuller. He spent significant portions of his time during his graduate work at Los Alamos National Laboratory with support from the Institute for Geophysics, Planetary Physics and Signatures working with staff members in T-2, the Nuclear & Particle Physics, Astrophysics & Cosmology group. His research focused on constraining the microscopic quantum physics of nuclei and particles with precision cosmological observations. Upon graduation from UCSD last year he joined the physics department at the University of Michigan as a postdoctoral fellow working primarily with Fred Adams. At UM, Evan continues his work in the physics of the early universe and cosmology while beginning work on multiverse calculations. In these calculations, he examines what sets of values for the fundamental constants lead to conditions suitable for habitability.

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